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**WHAT IS CLAIMED IS:**

1. A device for producing a broadband communications signal comprised of:

a chaotic circuit modulated by an informational signal;

10 a circuit to remove a periodic part of the chaotic signal to produce a broadband communications signal without any periodic parts;

a transmitter for transmitting the broadband signal with periodic parts removed;

a receiver for receiving the transmitted broadband signal with periodic parts removed;

a nonlinear operator circuit for reconstructing the periodic part of the chaotic signal; and

a demodulator for demodulating the informational signal contained in the chaotic signal.

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2. A device, as in Claim 1, wherein the demodulator is a phase demodulator.

3. A device, as in Claim 1, wherein the demodulator is a frequency demodulator.

4. A device, as in Claim 1, wherein the circuit to remove a periodic part of the chaotic signal to produce a broadband communications signal without any periodic parts is a nonautonomous

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5 Duffing chaotic circuit.

5. A device, as in Claim 1, wherein the circuit to remove a periodic part of the chaotic signal to produce a broadband communications signal without any periodic parts is a piecewise linear Rossler circuit.

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6. A device for producing a broadband communications signal comprised of:

a chaotic circuit modulated by an informational signal;

a circuit which produces periodic signals in order to remove a periodic part of the chaotic signal to produce a broadband communications signal without any periodic parts;

a transmitter for transmitting the broadband signal with periodic parts removed;

a receiver for receiving the transmitted broadband signal with periodic parts removed;

a nonlinear operator circuit for reproducing the periodic part of the chaotic signal to produce a replica of the informational signal; and

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a phase demodulator for demodulating the informational signal containing the chaotic signal.

7. A device for producing a broadband communications signal comprised of:

a chaotic circuit modulated by an informational signal;

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a filter circuit to remove a periodic part of the chaotic signal to produce a

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- 5 broadband communications signal without any periodic parts;
- a transmitter for transmitting the broadband signal with periodic parts removed;
- a receiver for receiving the transmitted broadband signal with periodic parts removed;
- a nonlinear operator circuit for replacing the periodic part of the chaotic signal to
- 10 produce a replica of the informational signal; and
- a frequency demodulator for demodulating the informational signal containing the chaotic signal.
8. A device for producing a broadband communications signal comprised of:
- a chaotic circuit modulated by an informational signal;
- piecewise linear Rossler circuit to remove a periodic part of the chaotic signal to
- produce a broadband communications signal without any periodic parts;
- a transmitter for transmitting the broadband signal with periodic parts removed;
- a receiver for receiving the transmitted broadband signal with periodic parts
- 20 removed;
- a nonlinear operator circuit for replacing the periodic part of the chaotic signal to
- produce a replica of the informational signal; and
- a frequency demodulator for demodulating the informational signal containing the chaotic signal.

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5 9. A device for producing a broadband communications signal comprised of:

a chaotic circuit modulated by an informational signal;

piecewise linear Rossler circuit to remove a periodic part of the chaotic signal to

produce a broadband communications signal without any periodic parts;

a transmitter for transmitting the broadband signal with periodic parts removed;

10 a receiver for receiving the transmitted broadband signal with periodic parts

removed;

a nonlinear operator circuit for replacing the periodic part of the chaotic signal to

produce a replica of the informational signal; and

a phase demodulator for demodulating the informational signal containing the

15 chaotic signal.

10. A method for producing a broadband communications signal comprised of the steps of

:

producing a chaotic circuit modulated by an informational signal;

removing a periodic part of the chaotic signal piecewise linear Rossler circuit to

20 produce a broadband communications signal without any periodic parts;

transmitting the broadband signal with periodic parts removed;

receiving the transmitted broadband signal with periodic parts removed;

replacing the periodic part of the chaotic signal to produce a replica of the

informational signal using a nonlinear operator circuit for; and

25 demodulating the informational signal containing the chaotic signal using.